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Toward a Global Information Locator

The Global Information Locator has a simple goal. We want to make it easier for people to find information.

The United States put forward an initiative within the G7 Environment and Natural Resources Management project. This does not mean that the Global Information Locator only applies to G7 countries. Nor that it only addresses environmental information. The Global Information Locator should be seen as a fundamental part of the Global Information Society.

This initiative is not just about technology. Although we make use of electronic networks, the basic ideas apply to all the ways that people share information.

Discussion Topics

I would like to present some thoughts on each of the following topics:

- What is a locator?
- How can we enhance the sharing of locator information?
- What are the basic principles of a Global Information Locator?
- How does it serve content owners, and how does it serve intermediaries?
- How does this approach serve users, whether browsing or searching for information?
- Where are we now in realizing the vision?
- What needs to happen next?

What is a Locator?

A "locator" is a kind of information resource. Its main purpose is to identify other information resources. Its contents describes what information is available in those resources. It also assists users in how to obtain the information.

What are some examples of Locators?

TV Guide is a locator for television programs. An atlas is a locator for places. The White Pages is a locator for people who have telephones. The Yellow Pages is a locator for businesses.

Many stores publish a locator of the products they sell and shoppers use this catalog from home. Even stores that do not publish a catalog have a locator for internal use--their product inventory.

In libraries you find these and many other locators. You also find a card catalog--a locator for books and other information resources in the library.

So, locator entries can refer to all kinds of media. You can also express the locator entries in any media.

You can use computer media. You might choose a bulletin board system, the Internet or X.500. You might create a computerized kiosk. Or, you might publish copies on CD-ROMs and floppy disks.

You can publish locator information in books, periodicals, or newsletters. You can distribute it through the mail, or post it on community bulletin boards.

Or, you might need to provide personal attention. You might operate a telephone reference service or a walk-up help desk. Or, you might canvass people door-to-door to help them get the information they need.

This is a crucial point. The Global Information Locator is NOT just a locator to networked information. It is a locator for ALL kinds of information.

Yes, we need network mechanisms to decentralize the information locators. But, people can get the locator information without being on a network. You help people find information through whatever means are appropriate for the particular community.

Sharing of Locator Information

Shopping centers often create a directory to help shoppers find which stores have what products. Of course, some stores put a lot of effort into catchy window displays. I imagine they would like for customers to wander around a bit in the shopping center. But, the shopping center as a whole must also help customers shop efficiently. Frustrated shoppers may go elsewhere.

Sharing directory information helps not only the customers. The shopping center itself has an information infrastructure that must include locators. Just imagine organizing a networked shopping center with thousands of storefronts!

Libraries have taken this directory idea one step further. Many libraries share their complete inventory listing in a common way. This allows for creation of a union catalog spanning many otherwise separate libraries. For example, one such union catalog brings together 33 million items across 10,000 libraries. People on public networks search this standardized locator directly. It is one of many already existing pieces of the emerging Global Information Locator.

The Global Information Locator initiative focuses on sharing locator information across organizations. Whether in libraries or shopping centers, the goal is to make it easier to find information.

This is the essence of the Government Information Locator Service (GILS) in U.S. law and policy. The U.S. National Spatial Data Infrastructure is creating a locator for digital maps. It is compliant with GILS, though built on a spatial metadata standard. And, this locator approach supports the G7 Environment and Natural Resources Management project. In each of these projects, we are implementing a decentralized library of data and information.

We are talking here about a global infrastructure that carries a precious commodity--information itself. We must think carefully of the implications for societies worldwide. I believe the Global Information Locator approach will enhance the flow of information among and within societies. In so doing, it may help redress some of the information disparities between developed and developing countries.

Enabling Principles

Here are a few basic principles we would want in a Global Information Locator.

We must adopt open standards, and fully coordinate these through the international, voluntary standards processes.

The approach must support the diversity of sources, and points of view, in our Global Information Society. A drastic alternative future would see information locators controlled by media giants and a few dominant governments.

Obviously, we must design the Global Information Locator for international use. It must be sensitive to the world's many languages and technical standards. It must also accommodate policy, legal, and financial issues. Among these are copyright, security, confidentiality, and coordination of payments.

We all know that the printed word has reshaped human communication over the last 500 years. But, we still do not have good filters for existing information nor the floods of new information.

A Global Information Locator must handle the meaning of information in different contexts. It must be extensible into the many ways people extract information from data. We not only recognize patterns in text. We seek patterns in photographs of people or land surfaces. We pick out patterns in video recordings and broadcasts. We characterize fingerprints and gene sequences. And, we sift through abstract data to gain insights into whole earth systems.

We must build for the future, knowing that this information infrastructure will be with us for the long term. But, we must also preserve access to accumulated knowledge. This means working with the culture treasure houses we know as libraries, museums, and archives worldwide.

Content Owner Perspective

Information content owners range from writers and database compilers to artists and movie studios. With modern networks, millions of content owners suddenly can afford to distribute information widely. How will new and traditional content owners make their products known?

Content owners usually rely on intermediaries for distribution. They want to reach many markets, so they prefer non-exclusive contracts. Sometimes, though, content owners link up with exclusive distributors. When vertically integrated, information is likely to be less widely accessible. And, there is then no incentive for locators to reference other media. Why doesn't your TV listing include your local theater and high school sports events? Why don't newspapers also provide references to related materials in library catalogs? Why don't road maps let you see today's restaurant specials as you drive by?

The Global Information Locator allows content owners to avoid vertical integration with distributors. It places no barriers between media and no constraints on how you organize information. The natural arrangement is a web-like mesh. All kinds of information sources link to each other in many ways.

Sometimes it does makes sense to arrange information in a tree-like structure. The proposed Global Information Locator supports that model, too. For example, the U.S. has an organizational directory for Federal information sources. But, this tree structure coexists with other independent structures, perhaps organized by topic or by region. By giving no preference to any one authority regime, we maximize flexibility.

Intermediary Perspective

Intermediaries facilitate public access to information. Intermediaries may be commercial information services, traditional publishers, or libraries. They may be non-government organizations or governments themselves.

The intermediary's job is to bring information into focus. Out of the information pool, they filter those pieces of particular interest. They then sell or freely distribute those pieces in forms appropriate to the audience. Sometimes the information arrives over networks, CD-ROM's, and bulletin board systems. But, often it arrives in paper, in person, or through the telephone. In the Global Information Locator, there are no constraints on how intermediaries present information.

The Global Information Locator does require that networked locators support the information search standard. For the intermediary, this support for direct searching greatly simplifies the information gathering task.

Direct searching also means that individual users can bypass the intermediary. The direct user can scan global information resources of all kinds, picking whatever is most interesting. This direct access ensures the free flow of information that is so crucial to democracy, science, commerce, and development.

Users as Browsers and Searchers

There is a useful distinction between browsing and searching for information. You might say a browser is window-shopping, while a searcher is trying to snag a specific product.

If you lay out a store, you create the shopping environment for your expected customers. If you list in a broader catalog like the Yellow Pages, you also have external requirements.

The Global Information Locator does specify a small set of requirements. These apply to network servers functioning as locators to data, documents, or literature. For example, there are today some 60,000 World Wide Web servers that support Internet browsers. When these support searching as part of the Global Information Locator, they also serve searchers.

This is not an either-or situation. Making information searchable is in addition to the ways you choose to reach your primary audience. Information distributors need to display their products in engaging ways--just as shopping center stores should have attractive window displays. However, your window dressing only communicates to browsers who happen by. To reach everyone else, you need to be sure your networked server supports the search standard.

The Global Information Locator initiative supports conventional marketing of information. But, it recognizes that marketing alone cannot meet all information needs. You might say that we see the roles of bookstores and libraries as overlapping and complementary.

The Global Information Locator requirements are relatively trivial to implement. Yet, this simple piece of infrastructure is as critical to our Global Information Society as networks themselves.

Where Are We Now?

To realize this vision, we do not depend on controversial international agreements nor massive investments. Instead, we seek to build consensus on a sustainable approach with broad societal support.

The basic standards and necessary infrastructure already exist. International groups such as libraries and information service associations have been building interoperability for decades. Network server technology is ubiquitous and rapidly decreasing in price and complexity.

There are only two dominant inter-network technologies worldwide--Internet and OSI. The search standard proposed for the Global Information Locator works on both kinds of networks.

There are already commercial and freeware sources of client and server software compliant with the search standard. As of now, though, these only support a few of the major national languages.

The United States has law and policy for implementing the Government Information Locator Service (GILS). United States policy may be only an example, but anyone can adopt the technical standards. Several states and other nations as well as non-governmental groups are already doing so. They recognize that adopting these standards greatly expands their reach, both externally and internally. Their information sources link up with libraries, museums, and government information worldwide. Yet, they do not lose local control.

Within the G7 Global Information Society initiative, there are a series of eleven demonstration projects. Consensus on a Global Information Locator is one goal of the Environment and Natural Resources Management project. The experts group of this project is meeting in Rome next week. Later, I will provide a pointer to information about the G7 project.

What needs to happen next if we are to realize the vision of a Global Information Locator?

The immediate challenge is to publicize the vision and demonstrate its utility. Developing nations and smaller content owners have the most at stake, since they cannot exert market pressure to assure equity in access to the Global Information Infrastructure. Unfortunately, they are often unaware of these fast-moving and somewhat technical issues. And, they may not realize that the flow of information is a crucial aspect of their national infrastructure.

The basic ideas of the Global Information Locator are not controversial. I have found enthusiastic support in discussions with telecommunications and information service corporations. Most companies realize they cannot own all the information content their customers will want. But, it is not clear how soon the company needs to rethink its mass market business model.

On the technical side, we need to draft an International Standardized Profile using the GILS Application Profile as a model. We must coordinate that profile with related standards through the International Telecommunications Union and the Internet Engineering Task Force. We also need to support formal interoperability testing to verify the engineering as it evolves.

We do need to find a home for this initiative, where its long-term evolution can be nurtured. For example, United States public law requires periodic review of the effectiveness of GILS. The U.S. law also specifies that recommendations for improvement be presented to Congress. It is not yet clear what venue would provide international oversight of the Global Information Locator over the decades.

Summary of the Initiative

In summary, here are the major ideas that underlie the Global Information Locator initiative.

- We need to develop the Global Information Locator through the voluntary, open standards processes.
- The locator should be implemented on networks, but designed to locate information in all forms.
- The crucial role of intermediaries should be clearly recognized. It is not feasible nor desirable to establish master repositories to serve all the world's information needs.
- The information locator should enable content owners and intermediaries to draw from other locators. It should also make it easy for them to make their value-added products known through the same mechanism.
- The overall locator should show no preference toward any particular hierarchy or other way of organizing information. Rather, it should allow many organizing structures to co-exist.
- The adopted standards must be evolutionary. They must accommodate the variable pace at which different parts of the world become full participants. These standards must also recognize we are only beginning to address an incredibly complex challenge--helping people communicate across barriers of culture, language, and time.

Information about the Government Information Locator Service (GILS) and the Global Information Locator is available on the Internet. Using a World Wide Web browser, go to the location:

http://www.usgs.gov/gils/index.html

To subscribe to the mailing list for information on the G-7 Environment and Natural Resources Management Project, send an e-mail message to:

majordomo@nsipo.nasa.gov *(in lower case)*

Within the body of the message say:

subscribe enrm-info

Toward a Global Information Locator

Why a Global Information Locator?

Although the global information revolution continues to make ever more vast amounts of information available, few of these information resources are made known in a common manner. Users have extreme difficulty just in trying to find relevant materials. A Global Information Locator would have immediate practical application in international areas such as Agenda 21, environmental monitoring, humanitarian assistance, and U.N. administration.

The Global Information Infrastructure is emerging at a revolutionary period in the history of information. Technological breakthroughs have expanded radically the possibilities for electronic access. In particular, peer computer networks such as Open Systems Interconnection (OSI) and the Internet allow for a decentralized approach to information dissemination. In this approach, many different information sources can be maintained separately yet any user can choose to view them as a whole. The U.S. Government Information Locator Service (GILS) uses such a decentralized network approach based on adoption of existing international standards.

How could a Global Information Locator be established?

A Global Information Locator using GILS as a model is part of the project for Environment and Natural Resources Management adopted in February 1995 at the G-7 Ministerial Conference on the Information Society. The U.S. GILS initiative has several characteristics that are important for a Global Information Locator. Being decentralized and based on open standards, it encourages dissemination by a wide diversity of sources, both public and private, that serve the myriad public and governmental needs for information.

The open systems design assures that many different information systems can be separately developed yet be interoperable when implemented. Interoperability depends on a stable reference, known as an application profile, that is openly negotiated among implementors, documented, and made widely known. For the Global Information Locator, an International Standardized Profile could adapt the existing GILS Profile to establish common practices for identifying and describing information resources globally. The profile would state the functions and environments within which it applies, and would identify options and parameters of existing standards needed to achieve a Global Information Locator. As with the GILS Profile, the Global Information Locator would operate on the Internet as well as OSI-compliant networks, and would use open standards for information search and retrieval such as ISO 10162/10163.

The application profile for the Global Information Locator would not limit how information is maintained at the source nor how information is displayed to users. Alternative ways to organize and present networked information would continue to be encouraged, but participants in the Global Information Locator would support such alternatives in addition to the profile.

Success of the Global Information Locator does not depend on massive government investments or sweeping international agreements. Rather, by adopting existing international information standards, it builds on the efforts of the responsible and talented people worldwide already working on information access. For example, software that supports direct access will be available for free from many sources worldwide and will be embedded within commercial computer applications ranging from the very simple to those that interpret natural language or filter search requests to sift through huge amounts of information.

The Government Information Locator Service (GILS)

As part of the U. S. National Information Infrastructure and through the Paperwork Reduction Act of 1995, the Federal government is establishing GILS to help the public locate and access information. Bulletin 95-1 from the Office of Management and Budget specifies Federal agency responsibilities, and a Federal Information Processing Standard (FIPS PUB 192) provides that Federal agencies should comply with the Open Systems Environment implementor's agreement known as the GILS Application Profile. Internationally accepted standards are also essential for a Global Information Locator.

"Every year, the Federal Government spends billions of dollars collecting and processing information (e.g., economic data, environmental data, and technical information). Unfortunately, while much of this information is very valuable, many potential users either do not know that it exists or do not know how to access it. We are committed to using new computer and networking technology to make this information more accessible to the taxpayers who paid for it."

Technology for America's Economic Growth,
A New Direction to Build Economic Strength
(United States strategic technology policy)

What is GILS?

GILS will identify public information resources throughout the U.S. Federal Government, describe the information available in those resources, and provide assistance in obtaining the information. It will consist of a decentralized collection of agency-based information locators and associated information services. GILS supplements, but does not necessarily supplant, other agency information dissemination mechanisms and commercial information sources. GILS uses network technology and voluntary, international standards for information search and retrieval so that information can be retrieved in a variety of ways, and so that GILS direct users can find many other information resources worldwide. GILS also provides for automated linkages that facilitate electronic delivery of off-the-shelf information products, as well as guiding users to data systems that support analysis and synthesis of information.

The public will be served by GILS through intermediaries or directly. While GILS will encompass a very wide range of information sources and many mechanisms for finding and delivering information, U.S. Federal agency information resources will be identified in a common way using the specified GILS Core Elements. The set of locator records comprising the US Federal GILS Core will be accessible on public networks without charge to direct users. Central disseminating agencies such as the Government Printing Office and the National Technical Information Service will act as intermediaries to GILS, as will public libraries and commercial information services. Access to GILS contents may also be accomplished through kiosks, electronic mail, bulletin boards, and off-line media such as floppy disks, CD-ROM, and printed works.

Where to find more information on the Government Information Locator Service (GILS)

A report describing how GILS will be implemented is available on the FedWorld electronic bulletin board (703-321-8020) in the "misc" directory, or via the Internet on anonymous FTP (File Transfer Protocol) at host **www.usgs.gov** in the directory /pub/gils as the files **gils.doc** (Word for Windows), **gils.rtf** (Rich Text Format), and **gils.txt** (ASCII text). On the World Wide Web, GILS is described and demonstrated at the location **<URL:http://www.usgs.gov/gils>**.